Setting Standards for Excellence

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Vice President, Government Affairs

September 12, 2002

Arthur H. Rosenfeld
Commissioner and Associate Member
Energy Efficiency Committee
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Dear Commissioner Rosenfeld:

Thank you for meeting with me on August 29, 2002 in Sacramento. Pursuant to our discussion, the following are comments and concerns on behalf of the NEMA Luminaire Section Outdoor Lighting Task Force (hereinafter referred to as the "Task Force"). As you are aware, the Task Force represents some 16 lighting companies or brand names and encompasses almost 90 percent of the lighting market with almost $2 billion in outdoor lighting shipments in 2001.

General Observations

This letter specifically addresses the questions submitted to NEMA by CEC staff Maziar Shirakh in his August 27, 2002 electronic mail. It should also serve to clarify the NEMA Task Force position regarding the development of outdoor energy lighting energy efficiency standards in California. The three specific areas submitted to NEMA for clarification are:

1. Cutoff luminaires to control glare;
2. Nationally recognized illumination standards, including the IESNA; and
3. Lighting controls to reduce outdoor lighting when they are not needed.

The Task Force wishes to reiterate its concern regarding the scope of measures covered by the Commission in this outdoor lighting rulemaking. As you are aware the CEC has drafted nine different measures in just six months with the anticipation of finishing them before the end of the year. While members of the NEMA Task Force have been engaged in this CEC activity since May 2001, the Task Force did not receive any tangible CEC recommendations to comment upon until publication of the June 6, 2002 draft proposal.

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The Task Force has suggested to the CEC staff on various occasions that focusing on fewer measures would provide more productive and timely results. The NEMA Task Force remains committed to working with you and your staff to accomplish a tailored, reasonable and measurable set of goals. In that regard, the Task Force recommends a scope that addresses only unconditioned buildings and parking lots. This will support your interest in developing a timely standard that can be endorsed by various stakeholders. Since the scope of these standards embark on a new area for the Commission, we believe it would be prudent to achieve success with a narrow scope and delay other measures until more research and national recommendations are established regarding outdoor lighting.

The Task Force appreciates your concerns regarding the timing to develop these standards. However, as we wrote to you in June 2002, such a "fast-track" proceeding will restrict opportunities for thoughtful, informed and thorough comment. The open process of research, comment, further analysis and scientifically based conclusions is the tedious but respected work of recognized rulemaking. For example, the Task Force has attempted to explain that there is no single solution (for glare or illuminance levels) that can be applied to all outdoor applications. Indeed, many of the items being addressed require a clearer definition from IESNA. Definite standards are premature at this time.

1. Cutoff Luminaires to Control Glare

The NEMA CEC submission and other materials strongly recommends the use of luminaires with limited uplight. This recommendation is designed to encourage the use of luminaires that are less likely to cause glare, sky glow and light trespass. However, these documents also identify exemptions to the general recommendations related to compelling safety or security concerns, areas requiring special product aesthetics or vertical illuminance criteria, temporary lighting used for emergency or nighttime work, or lighting used solely to enhance the beauty of an object or special public events.

This information must be referenced in the whole: it is absolutely crucial that the whole of pages one and two of the NEMA "Recommended Practices and Standards for Outdoor Lighting Applications" (CEC Outdoor Lighting submission) encompassing the recommendations in points one through five and the exceptions in points one through seven be read in their entirety without separation. When the NEMA principals are referenced the exemptions must also be considered. Recommendations listed in the NEMA documents cannot be extracted out of context to suit specific interests.

The NEMA Task Force has been told by CEC staff that specific exemptions or exceptions cannot be accommodated in a CEC rulemaking. We seek a timely elaboration and clarification on this point with specific answers as to whether a CEC rulemaking can or cannot allow for exemptions or exceptions, and the process to accomplish them.

It appears that there has been fundamental misunderstanding related to the scope of the Task Force's recommendations for cutoff optics in various applications. The CEC June 6, 2002 draft requires the use of cutoff luminaires as a flat policy approach for all nine measures. Clearly, cutoff lighting for several of the applications is meaningless, such as unconditioned buildings (an interior application), façade lighting and sign lighting. With respect to the measures being developed by the CEC, the NEMA Task Force supports a requirement for cutoff criteria only for Measure 2 (parking lots). For Measure 2, the NEMA Task Force recommends that Lighting Zone 1 apply full cutoff luminaires; Lighting Zone 2 apply cutoff luminaires; and Lighting Zones 3 and 4 apply semi-cutoff luminaires. The remaining measures have a high percentage of applications that require consideration of the exemptions listed above.

While not specifically mandated in the regulatory requirement, the NEMA Task Force recognizes that glare issues may be considered in the CEC outdoor lighting rulemaking. The CEC has stated that glare poses a known risk to public safety. Stakeholders must have the opportunity to review specific, credible science on this issue that the CEC is relying upon to make these assessments. Without those materials, it is impossible for the Task Force to respond to CEC recommendations on the glare matter beyond what NEMA has already submitted.

From our submissions, the NEMA Task Force recognizes that glare occurs when a bright source causes the eye to continually be drawn toward the bright image or source and prevents the viewer from adequately viewing the intended target. Glare may create a loss of contrast or an afterimage on the retina of the eye reducing overall visibility. Moreover, there are two situations where glare occurs: (1) when a spot in a field of view is significantly brighter in contrast to the rest of the field of view; and (2) when a significant difference in light levels exists between adjacent areas.

The NEMA Task Force also recognizes two distinct classifications of glare: *discomfort glare* and *disability glare* as defined in our submission. Discomfort glare does not necessarily keep the viewer from seeing an object but does cause a constant adaptation of the eye to the contrast of light levels that in turn cause a sensation of discomfort. Disability glare occurs when the bright source causes stray light to scatter in the eye. This causes the primary image on the retina to be obscured. It may prevent the viewer from seeing things of importance.

2. Nationally Recognized Illumination Standards/IESNA Recommendations

The NEMA *Statement of Principles on Outdoor Lighting Codes* recommends minimum illuminance levels acceptable for the intended purpose with consideration to nationally recognized standards. There are four key areas that need to be addressed with regard to nationally recognized illuminance standards:

1 *IESNA Recommended Practice Documents*. IESNA has published several Recommended Practices (RPs) addressing various outdoor lighting applications. These RPs are nationally recognized, but are designed to provide lighting recommendations – not mandates. Moreover, RPs are in a near constant state of review. Lighting system users, specifiers, and designers may deviate from IESNA RP content as a matter of practical necessity based on factors such as the requirements of insurance underwriters or in response to customer complaints or site/operation specific security concerns.

In several measures, the basis of the CEC models appears to reference RP-33-99, *Lighting for Exterior Environments*. However, RP-33-99 does not always adequately address the task or consumer requirements for all exterior applications, such as security and merchandising. The IESNA Outdoor Retail Sales Lighting subcommittee has suggested that RP-2-02, *Lighting Merchandising*, is more current than RP-33-99 and provides a more reasonable approach to lighting associated with retail facilities, including parking lots, building grounds and outdoor retail. While recommended light levels have historically been well documented, the IESNA's consideration and recommendation of specific limits on levels, glare, and light trespass, as a function of environmental (or lighting) zones and curfew hours, is still not uniform across all RP documents. As an example, RP-33-99 incorporates environmental zones, but does not detail glare or trespass limits in those zones. RP-8-00, a more recent publication, makes no specific recommendations but does reference IESNA Technical Memorandum TM-10-99 and other IESNA and CIE literature concerning glare and sky-glow issues. In summary, the IESNA is the 'best available reference,' and has multiple publications on outdoor lighting, but it is by no means the only information source that should be considered when establishing a lighting standard.

2. *Illuminance in Lighting Zones*. With respect to illuminance targets for specific lighting zones, only RP-33-99 recognizes lighting zones. As indicated above, RP-33-99 is not generally the most appropriate RP to reference for all applications. The illuminance levels targeted for the four lighting zones in the CEC proposal are not substantiated based on IESNA recommendations. We recognize that IESNA has agreed that all future RPs will address lighting zones, but at this time it is inappropriate to assume that a single recommended IESNA illuminance level in an RP relates to a specific Lighting Zone for the CEC proposal. Other than RP-33-99, the NEMA Task Force is not aware of any standards that document the illuminance levels targeted for each of the four Lighting Zones defined in the various CEC measures. Since IESNA RPs don't comprehensively address illuminance level requirements for lighting zones, the CEC draft standard is not fully substantiated by IESNA or other recognized lighting standards.

3. *Minimum Illuminance Levels*. Many recommended illuminance levels are based on a minimum light level for the site. The minimum illuminance level identified in lighting specifications is a requirement for the entire site. The CEC proposal bases its lighting power density (LPD) model on the light level occurring in the middle of four poles. This will rarely, if ever, represent the minimum illuminance for the site. Failure to develop models that meet minimum illuminance levels for the entire site will compromise public safety. To date, NEMA has made several requests for data substantiating the CEC models and LPD recommendations. While we are aware of the supplementary CEC report published on June 25, 2002, this report does not add clarifying material to the June 6, 2002 report, and it does not address our concerns. Moreover, we have not been provided data that will substantiate the LPD recommendations.

4. *Common Practice*. Common practice must be a consideration in a regulatory process to fully understand the deviation from current design practices. Illuminance levels referenced in common practice specifications may exceed IESNA illuminance levels. Illuminance levels specified by NEMA customers indicates that light levels can vary, primarily related to considerations for safety and security, liability, and merchandising. Furthermore, common practice typically specifies minimum light levels for the site, rather than average illuminance. The CEC has stated that your standards cannot sanction practices and equipment that are known to pose a risk to the general public. In fact, many qualified professionals would argue that reduced light levels pose a risk to public safety. Listed below are common illuminance levels specified for a variety of application types.

Application	**Commonly Specified Minimum fc**
Elementary and Secondary School:	0.5 Footcandles
Colleges and Universities:	1.0 Footcandles
Retail Centers: (standard)	1-2 Footcandles
(enhanced security)	3-4 Footcandles
Hotels, Motels, Full Service Restaurants:	0.5 Footcandles
Fast Food Restaurants:	3.0 Footcandles
Automobile Dealerships: (front)	40-100 Footcandles
(back)	15-30 Footcandles
Commercial Buildings	0.5 – 1.0 Footcandles

[For a number of the CEC measures, the illuminance level used in the model differs significantly from the levels commonly specified.]

3. Lighting Controls to Reduce Outdoor Lighting

While outdoor lighting controls may save energy during non-peak hours, the Task Force is not aware of data suggesting this strategy will reduce peak energy demand. In addition, this strategy has not been proven to be technologically feasible. It has been suggested by CEC staff that a simple control strategy enabling certain luminaires to be switched-off can reduce energy in the event of a demand crisis. The Task Force cannot endorse this strategy due to the potential risk to personal safety for the general public caused by extreme variations in lighting uniformity and visual adaptation.
Some step-dimming ballasts used for indoor applications could be applied in wet-location outdoor products if used with a time control or other switching mechanism. However, these ballasts must be of specific circuit types such as the Constant Wattage Autotransformer (CWA) ballast. CWA ballasts are not available for all lamp sources that are used in the applications covered in the CEC measures. Reactor and High-Resistance ballasts, which are commonly used in low-wattage products, cannot be used for step-dimming. Other dimming ballasts used in interior applications may not be tested or rated for outdoor use due to the power transients present in outdoor applications. In each of these cases, the color characteristics of the light sources will change significantly when operating in a dimmed condition.

The CEC has stated that it will not mandate a specific control strategy and will not enforce curfews. Since only limited technologies exist to effectively support this concept and it will not be mandated, we believe it should be addressed through design education rather than through a standard.

Conclusion

1. The NEMA Task Force recommends paring the regulatory work down to measurable goals. At this time, the work would be limited to unconditioned buildings and parking lots as described in the foregoing. The other seven measures require further analysis and should be delayed.

2. The NEMA "Recommended Practices and Standards for Outdoor Lighting Applications" (CEC Outdoor Lighting submission) must be referenced in the whole and accommodate all exemptions.

3. The NEMA Task Force supports a requirement for cutoff criteria only for Measure 2 (parking lots). For Measure 2, the NEMA Task Force recommends that Lighting Zone 1 apply full cutoff luminaires; Lighting Zone 2 apply cutoff luminaires; and Lighting Zones 3 and 4 apply semi-cutoff luminaires. The remaining measures have a high percentage of applications that require consideration of the exemptions listed above.

4. While not specifically mandated in the regulatory requirement, the NEMA Task Force recognizes that glare issues may be considered in the CEC outdoor lighting rulemaking. The CEC has stated that glare poses a known risk to public safety. The NEMA Task Force requires specific, credible science on this issue that the CEC is relying upon to make these assessments. Without those materials, it is impossible for the Task Force to respond to CEC recommendations on the glare matter beyond what NEMA has already submitted.

5 IESNA Recommended Practices are not mandates and are not necessarily consistent with common practice. The assumption that a single recommended IESNA RP illuminance level relates directly to a CEC Lighting Zone is not supportable. Moreover, the NEMA Task Force requires further data substantiating the CEC LPD models. The CEC models and the calculation used to get the minimum illuminance levels do not take into consideration site-specific requirements.

6. The NEMA Task Force cannot endorse lighting controls in outdoor lighting applications because this technology is not readily available, technologically feasible, and may pose a risk to public safety because of variations in lighting uniformity and visual adaptation.

Finally, the October timeframe for the next standards workshop presents significant challenge to our members. The IESNA Street and Area Lighting Conference, NEMA semi-annual Lighting Division meetings and the Canada Lighting Energy Steering Committee are all scheduled in October. These meetings will require the attention of many of our members who have been involved with the CEC standards development process and will make it extremely difficult for our members to review materials and provide meaningful comments. We respectfully request a later workshop date and a minimum of two weeks to review materials prior to the workshop.

Thank you for your attention to the concerns of the NEMA Luminaire Section Outdoor Lighting Task Force. Please do not hesitate to contact me with questions or comments. I may be reached at (703) 841-3251 or via electronic mail at tim_feldman@nema.org.

Sincerely,

/S/

Timothy Feldman

cc: Commissioner Pernell
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